

# General approach of Stack-Test

11 partners:



Industrial advisory board:

Company	Comments
PSA Peugeot Citroën	Automotive
Powercell Sweden AB	APU
Paxitech SAS	Portable
IRD Fuel Cells A/S	micro-chp stack developer
Dantherm Power A/S	Backup and micro-chp
AREVA AS	Backup
Proton Motor Fuel cell GmbH	Transport
Schunk Bahn- und Industrietechnik GmbH	Transport
inhouse engineering GmbH	micro-chp stack developer
Daimler	Automotive
NuCellSys GmbH	Automotive
BAXI INNOTECH GmbH	micro-chp system developer

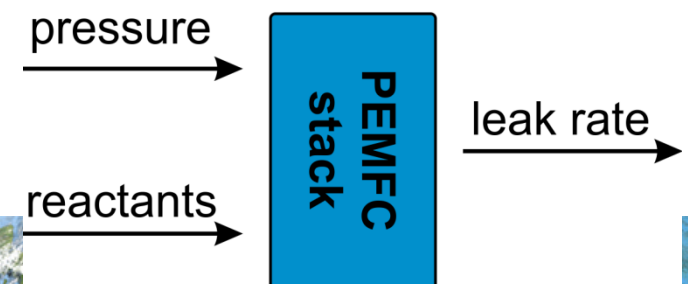
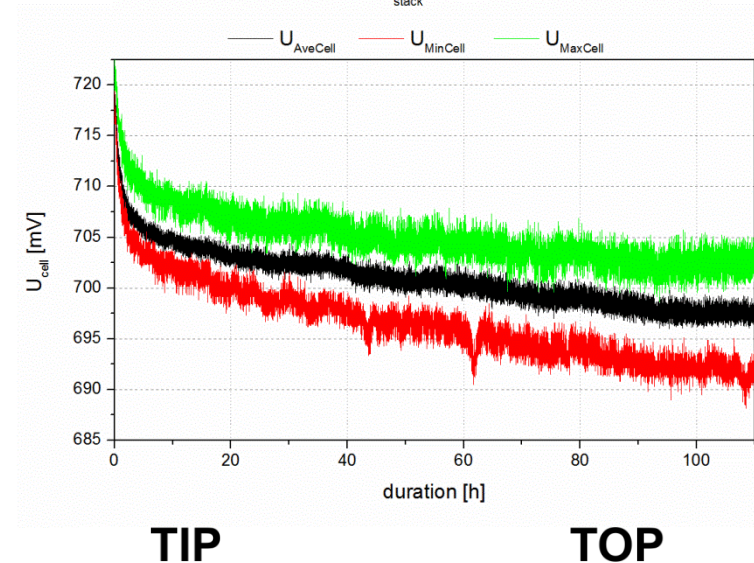
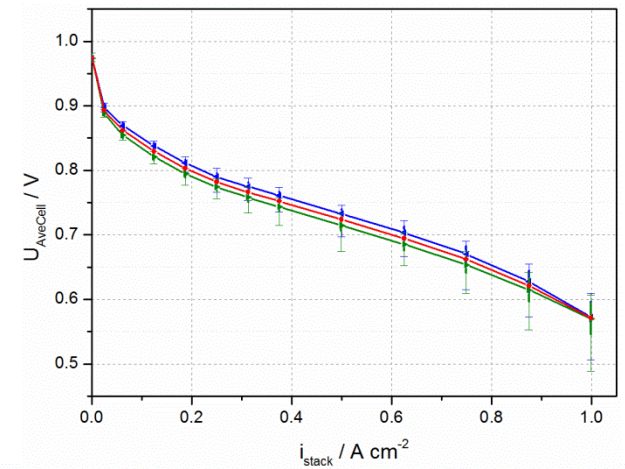


# General approach of Stack-Test

## 3 technical work packages regarding:

- functional and performance testing
- endurance testing
- safety and environment testing

All test procedures acquirable:  
[stacktest.zsw-bw.de](http://stacktest.zsw-bw.de)



## Conclusion – Functional and Performance Tests

- Complex TIP interaction for stack testing demands definition of critical TOCs, sensor positions and procedures
- TMs defined and validated for TIPs influencing the stack performance:
  - All test procedures for performance characterization covered
  - Performance influenced by:
    - Test equipment (e.g., humidification)
    - Sensor positions for parameter control
    - Direction of parameter variation
- TMs can be combined to different TPs:
  - Sequential approach
  - Nested approach
- Representative test operating conditions for all applications





# Conclusion – Durability and Endurance Tests

- Different procedures for 3 types of degradation tests:
  - Constant load
  - Load cycling (different cycles defined)
  - Start/Stop cycling
- High impact of test parameter and test bench dynamic on test results:
  - Humidification
  - Reactant supply (pilot time)
  - Electrical load (current transients)
- Definition for determination of degradation rate required
- Impact of test blocks and performance recovery procedures on test results

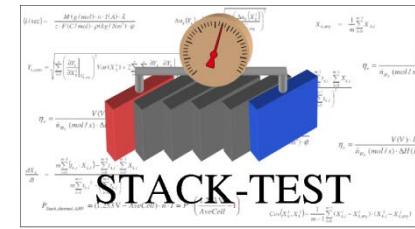


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Thank you very much for your attention!

All TM and TP documents  
available  
→ [stacktest.zsw-bw.de](https://stacktest.zsw-bw.de)

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